DOCUMENT RESUME

ED 269 757 CS 209 632

AUTHOR Geisler, Cheryl
TITLE Translating Instruction into Skill: Learning to Write Precisely.
PUB DATE 2 Jul 85
NOTE 11p.; Revised version of a paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, March 31-April 4, 1985).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cartoons; Higher Education; Influences; Measurement Techniques; Metacognition; Performance Factors; *Semantics; Training Methods; *Writing Processes; *Writing Research; *Writing Skills
IDENTIFIERS *Clarity

ABSTRACT

A study examined how teachers help students to write with greater precision. Subjects, 160 freshman students, wrote a single sentence describing a wordless Peanuts cartoon. They were asked to express specific semantic relationships (sequence/cotemporality, intention/instrument, and intention/enablement) between the actions in two contrasting versions of this cartoon. Prior to or during the writing task, students received instructional materials in one of four training conditions, or a nonverbal concept attainment task that served as the control. The measures of precision on the writing task were (1) production time (how long it took the writers to produce the description); (2) score (how well the writers expressed the semantic relationships); (3) satisfaction (how satisfied the writers were with their performance on the three relationships once the task was completed); and (4) estimate (how accurately the writers estimated their performance). Results showed that on no measure of time, performance, satisfaction, or ability of estimate performance, did the training conditions significantly alter the student's ability to write with precision. In contrast, the domain (the set of characters, actions, and activities) and the interaction of domain and version of the cartoon had repeatedly marked effects on student performance and ability to estimate performance. (HOD)

# Translating Instruction into Skill: Learning to Write Precisely

Cheryl Geisler

Carnegie-Mellon University

2 July 1985

This is a revised version of a paper given at AERA, Chicago, April, 1985 and reports part of the author's Ph.D. work in Rhetoric.

## The Problem

In an 1981 essay, Olson and Torrance suggested that to learn to write is to "learn to create autonomous text -- to write in such a manner that the sentence meaning is an adequate representation of the intended meaning." Even good writers find it difficult to produce an "autonomous text" -- intentions outpace knowledge; knowledge overrides intentions; or words simply fail. Many terms have been used to characterize this sought-for-quality: clarity (Williams, 1981), perspecuity (Campbell, 1776), plainness (Flesch, 1946), and, in this report, precision.[1]

To learn to write precisely, writers have to place highly automated sentence-producing, linguistic processes under intentional control. They have to intend to mean something; they have to mean it; and they have to have the knowledge to know they've meant it. The purpose of this study was to try to pull apart and compare the effects of the various ways teachers might influence this automated process towards greater precision.

## The Experiment

The task I used the measure precision focused on the sentence level. Freshmen students were asked to write a single sentence to describe a wordless Peanuts cartoon (See Figure 1 for an example). They were asked to make sure to express specific semantic relationships between the actions in those cartoons.

For the purposes of this experiment, the semantic relationships were three, one taken from each of three pairs of easily confused, but clearly distinct relationships: A. sequence/cotemporality, B. intention/instrument, and C. enablement/intention.[2] The relationships were associated with contrasting pairs of cartoons. In the cartoon in Figure 1, for example, Snoopy is shown to be intentionally distracting Linus by pointing in order to get his blanket. In the contrasting cartoon, Snoopy points and gets the blanket simply by accident.

The measures of precision used were four fold.

---

[1]The author would like to thank her advisors, David S. Kaufer and John R. Hayes, for support in this work.

[2]See Appendix 1 for technical definitions of these relationships.

1. **Production Time:** How long does the writer to take to produce the description (including time for revision)?

2. **Score:** How well does the writer express the three relationships requested?

3. **Satisfaction:** How satisfied is the writer with his or her own performance on the three relationships once the task is completed?

4. **Estimate:** How accurately can the writer estimate his or her performance?

Prior to or during the writing task, students received instructional materials in one of four conditions, or a non-verbal concept attainment task that served as the control

The four instructional conditions come from a model of skill acquisition suggested by Anderson (1983). Here skills is seen as a series of condition-action rules in the form

If the GOAL is X
and TESTS A, B, . . . are successful
Then execute the ACTIONS R, S, . .

The condition side of the production consists of a goal and a series of recognition tests; the actions side consists of a series of actions to be taken (which may also include the setting of new goals). According to this formalism, a writer will execute a particular action only if s/he is pursuing a particular goal and recognizes that the conditions specified by the tests are satisfied.

The first instructional condition gave students a better understandings of the goals (X in the formalism) of their task. That is, students were trained to see the differences between the semantic pairs in the contrasting pairs of non-verbal cartoons, for instance the difference between having an intentional relationship between the distracting and pointing as in the cartoon in Figure 1 and having simply an instrumental relationship.

The second condition gave students practice in producing the specific kinds of syntactic structures or actions (R, S, in the formalism) necessary to convey the requested semantic relationships. Here we used a type of sentence-combining exercise without any information about the meanings of those structures

The third condition gave students specific training in recognizing what semantic relationships are expressed by certain syntactic structures, such as "in order to" phrases expressing intentionality (A, B in the formalism).

The last condition moves to a higher meta-cognitive level to give students procedural facilitation in remembering and attending to the multiple goals of the task by asking students to make sure they have satisfied each of the constraints of the task

The design for the study crossed the four instructional conditions plus a control group with two other factors -- domain and version. Domain refers to the set of characters, actions and activities in the cartoons. The domain in Figure 1 involve Snoopy, Linus, and his blanket; another domain involved Snoopy and Lucy playing hockey There were four domains in all.

The second factor was version. In each domain, there were two versions of each cartoon, I and II, each including one semantic relationship from each of the three semantic pairs.

The overall design was a 5 x 4 x 2 factorial with 4 subjects per cell, for a total of 160 subjects who were run individually.

## Results

The Results were surprizing.

### Production Time

For production time, there were no significant differences between training conditions, domains, or versions. The average production time was 6.49 minutes, with a standard deviation of 3.88.

### Score

Scores for each sentence were obtained from judgments from two independent raters about what kinds of relationships were actually expressed between the three sets of verb pairs. These judgements were then compared to the relationships requested in the task, and transformed into -1 (expressed the opposite relationship), 0 (expressed neither relationship), or +1 (expressed requested relationship) The agreement between the two raters was 94% for Score A (cotemporality/sequence), 90% for Score B (intention/instrument), and 91% for Score C (intention/enablement), or 92% overall.

Overall score, the sum of Scores A, B, and C, showed significant effects for domain and

for the interaction of domain and version in ANOVA (See Figure 2). The domain x version interaction persisted in each of the individual scores, A, B, and C

The graphs in Figure 3 show the pattern of this interaction across the four domains. In Domains 1 and 2, Version I scored significantly higher than Version II In Domain 4, Version II scored significantly higher. In Domain 3, Version had mixed effects.

### Overall Satisfaction

Overall satisfaction is the sum of each students satisfaction udgements on the three semantic relationships (-1, not satisfied, 0 don't know; +1 satisfied). Analysis of variance showed no main effects for condition, domain, or version. The breakdown of a significant triple interaction ($.01 < p < .025$) for Domain x Condition x Version using Newman-Keuls showed no regular effects for Version within or across Domains. Nor was this variation due to any particular Condition.

### Overall Estimate

Overall Estimate, the last measure, was the sum of the differences between score and satisfaction on the three semantic relationships. A score of 0 represents a totally accurate estimate; a negative score an underestimate, and a positive score an overestimate.

Analysis of variance revealed an effect for domain and the interaction of domain and version. The main effect was due to particular low estimates in Domain 2. The interaction effect follows a similar pattern to the interaction effects for score In Domain 1, 2, and 3, Version I < II; in Domain 4, the relationship is reversed Only this last is significant according to Newman-Keuls.

## Discussion

Overall, then, on no measure of time, performance, satisfaction, or ability of estimate performance, did the training conditions significantly alter the students's ability to write with precision. In fact, there is no reliable difference between those who received some kind of training and those who received an incidental non-verbal task.

In contrast, domain and version had repeatedly marked effects on students performance

and ability to estimate performance.[3] In general, Version I is higher than Version II in Domain 1 and 2, mixed in Domain 3, and lower in Domain 4.

## Conclusion

This study began with a problem: how do teachers influence students in an automatic, mostly unconscious process like sentence production, to harness these skills, so to speak, for intentional purposes; that is, how do they help students to write with greater precision? The results suggests two answers.

First, under the conditions imposed in this experiment, we do not help students to write more precisely. The lack of even a trend in the direction of distinguishing trained from untrained conditions suggests the difficulty of the problem. Nevertheless, some writers do learn to place automated linguistic processes under intentional control, although this change has never been documented to be the direct *result* of instruction.

One possible explanation for the lack of effects may lie in the structure of the training. In this experiment, most of the instruction was completed before the production task was begun. Thus, subjects may not have been able to assimilate instructional information to the goal-directed productions relevant to the task. In an independent pilot study, subjects first attempted this task and then received feedback from tutors; under these conditions, they *were* able to express themselves precisely. Much of classroom instruction, of course, allows for instructional feedback in context.

The importance of context is even more strongly suggested by the second set of results. The significant interactions of domain and version across several measures document the importance of what students write about. Domain refers to the set of characters and activities to be written about; version refers to which of the semantic relationships were expressed in the cartoon and required by the task. Together the add up to a description of the "world" the students were trying to work in, both the contents and the constraints. In this experiment, semantic constraints were confounded with the content of the cartoons, thus making it impossible to pull apart these effects further with statistical analyses A linguistic

---

[3]Domain also had significant effects on the raters. Chi-square analysis revealed more disagreements in domain 1 than in domain 2 and 3, which in turn had more than domain 4

analysis now being performed may, however, help to further untangle the relationship between constraints, contents and writing precisely that this study has revealed

## Bibliography

Anderson, J. R. (1983). *The Architecture of Cognition* (Cambridge, Massachusetts: Harvard University Press).

Campbell, G. (1776) *The Philosophy of Rhetoric* Edited by L. F. Bitzer, (Carbondale, Illinois: Southern Illinois University Press), 1967.

Flesch, R. (1946). *The Art of PLain Talk.* (New York Harper and Brothers).

Olson, D. R., and Torrance, N. (1981). Learning to meet the requirements of written text: Language development in the school years. In C H. Fredericksen and J. F. Dominic (Eds.), *Writing: The Nature, Development and Teaching of Written Communication.* (Vol. 2, 1981, 235-255) Hillsdale, New Jersey: Erlbaum.

Williams, J. (1981) *Style: Ten Lessons in Clarity and Grace* (Glenview, Illinois: Scott Foresman).

# Appendix 1: Technical Definitions of the Semantic Relationships

**Cotemporaneous**

The connection or tense of the relevant verbs involves an explicit time relationship, one in which the duration of one action is considered to be contained within the duration of the other.

**Sequence**

The connection or tense of the relevant verbs involves an explicit time relationship, one in which one action is considered to take place outside of the duration of the other.

**Intention**

Two verbs are in an intentional relationship if one of them refers to the desired future state for which an actor does the other.

**Instrument**

Two verbs are in an instrumental relationship if 1) they are coreferential (refer to the same act), 2) involve the same actors, and 3) the doing of one accomplishes in whole or part the doing of the other.

**Enablement**

Two verbs are in an enablement relationship if they refer to distinct actions and one is seen as establishing some or all of the conditions for the second

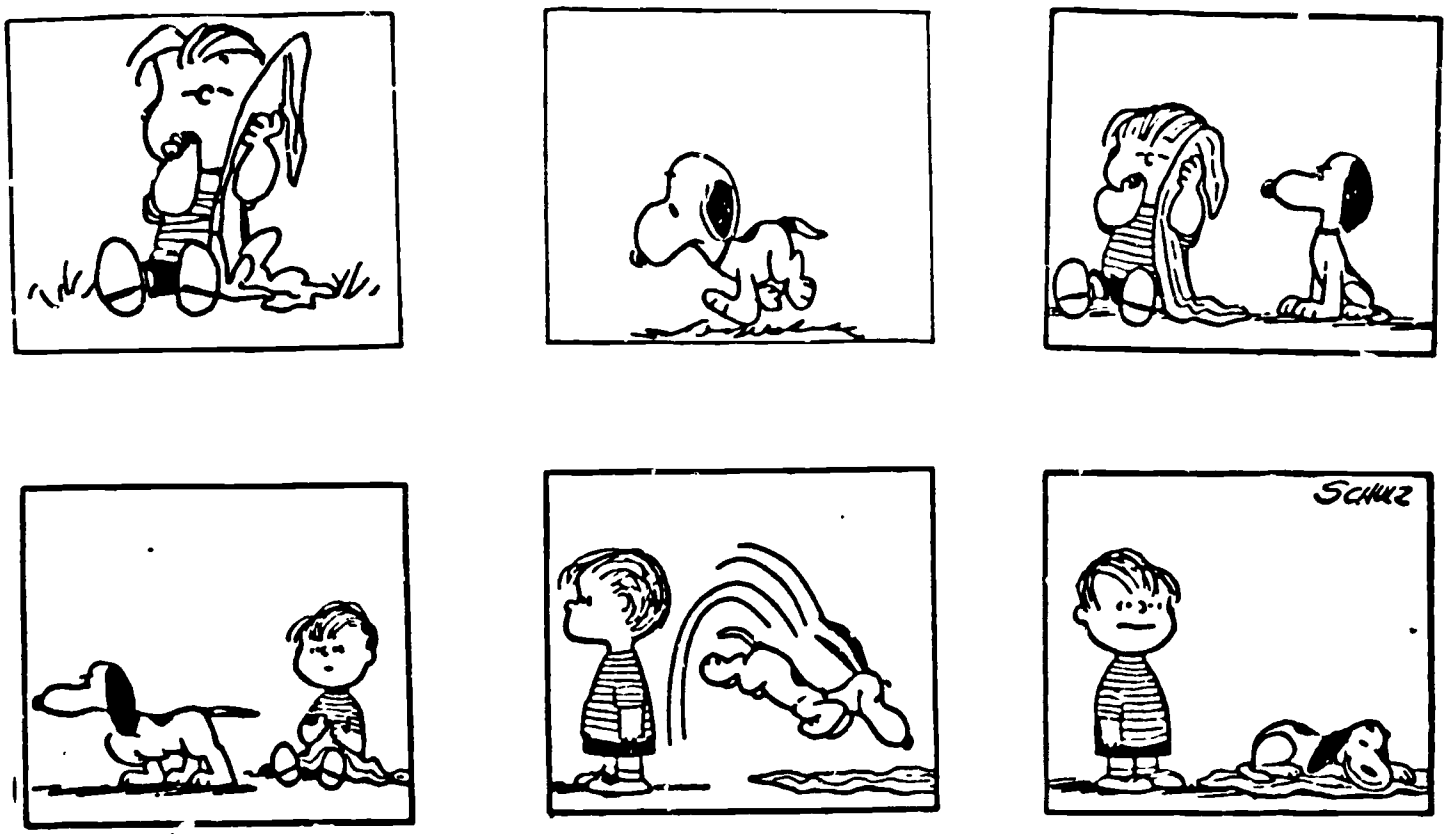
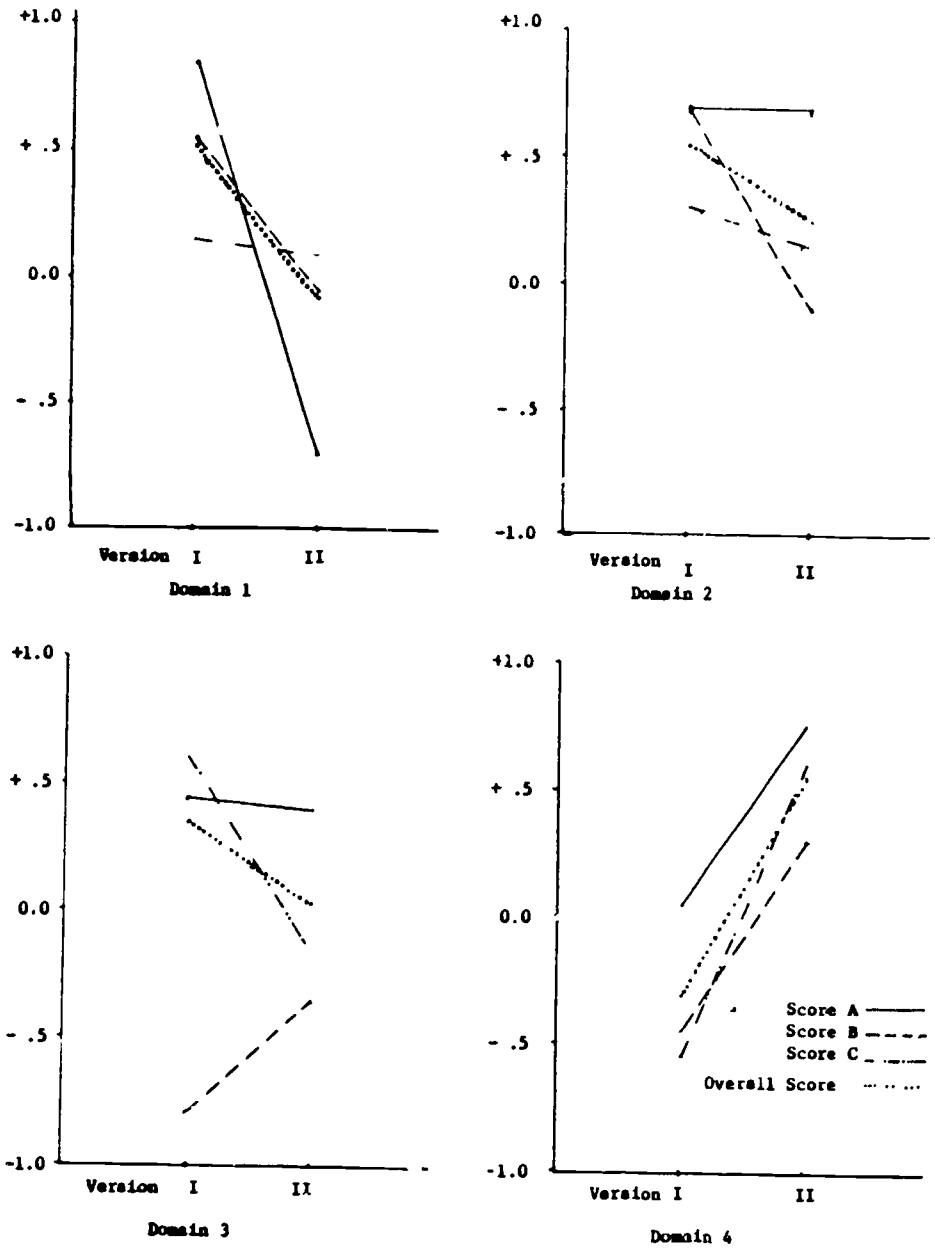



**Figure 1:** An example of a wordless Peanuts cartoon used as the stimulus in the sentence production task.

| Source | df | SS | MS | F | sig | |
|---|---|---|---|---|---|---|
| Condition | 4 | 5.46 | 1.37 | .80 | | NS |
| Domain | 3 | 27.87 | 9.29 | 5.47 | .001< | p < .01 * |
| Version | 1 | .50 | .50 | .29 | | NS |
| Dom x Cond | 12 | 35.29 | 2.94 | 1.73 | .05 < | p < .10a |
| Dom x Ver | 3 | 108.82 | 36.27 | 21.34 | | p < .001 * |
| Cond x Ver | 4 | 7.34 | 1.84 | 1.08 | | NS |
| Dom x Con x Ver | 12 | 23.61 | 1.97 | .42 | | NS |
| Error | 120 | 48 | .4 | | | |
| Total | 159 | 413.24 | | | | |




Domain x Version Interactions for each of the three semantic relationships and overall.

**Figure 2:** Domain x Version Interactions for each of the three semantic relationships and overall score.